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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/825,796 | 03/29/2004 | John L. Cesulka | AFD 666 | 9100 |

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DEPARTMENT OF THE AIR FORCE
AFMC LO/JAZ
2240 B ST., RM. 100
WRIGHT-PATTERSON AFB, OH 45433-7109

| EXAMINER | |
|---|---|
| OWENS, DOUGLAS W | |
| **ART UNIT** | **PAPER NUMBER** |
| 2811 | |

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/825,796 | CESULKA, JOHN L. | |
| | Examiner | Art Unit | |
| | Douglas W Owens | 2811 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☒ Claim(s) *13-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/29/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claims 2, 3 and 11 – 20 are objected to because of the following informalities:

In line 3 of claim 2, "are" should be replaced with "is".

In line 2 of claim 11, the term "and heat sinking a semiconductor device" should be replaced with "a heat sink and semiconductor device". The same change should be made in claim 12. It is not known what is meant by "heat sinking a semiconductor device", although the intent of the claim is understood since a method of mounting a heat sink and semiconductor device is disclosed.

In line 7 of claim 11, "includes" should be inserted between "also" and "locating"

In lines 10 and 13 of claim 13, "orthogonal of" should be replaced with "orthogonal to".

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 – 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The terms "of substantial width" and "extended depth dimensions" in claim 1 are relative terms which render the claim indefinite. The terms "of substantial width" and "extended depth dimensions" are not defined by the claim, the specification does not

provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The terms "substantial" and "extended" do not particularly point out and distinctly claim the subject matter regarded as the invention.

Claim 3 recites the limitation "...T arm portions are connected by tin/lead solder with selected of said printed circuit board surface...". The scope of the claim is vague, since there appears to be a word missing between "selected" and "of". Since it cannot be determined what is selected from the printed circuit board surface, it is not possible to determine the scope of the claim.

Claim 11 recites the limitation, "disposing said semiconductor device in a flowed thermal conductive media-maintained physical, thermal and electrical contact with a heat sink element of conductive metal thermal conductivity characteristics". The scope of the claim is vague since the claim language cannot be understood. Additionally, the intended meaning of the phrase "flowed thermal conductive media-maintained physical" is not known.

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 2, 4, 5, are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,648,889 to Bosli in view of US Patent No. 6,535,383 to Terhaar et al.

Regarding claim 1, Bosli teaches a heat sink inclusive semiconductor device mounting apparatus (Fig. 1a) comprising the combination of:

a circuit board (1), which would have inherently included an insulating material supporting an array of metallic film electrical conductors, since this is the standard structure of a circuit board;

a T cross-sectioned heat sink (2) having a T stem body element of substantial width and length and extended depth dimensions received in transverse of an aperture opening (11) of the circuit board;

said T cross-sectioned heat sink body member including T arm portions extending along and beyond said T stem body element substantial width dimension along a first surface of said printed circuit board;

said T cross-sectioned heat sink body member including first and second of said T arm portions disposed at opposed depth dimension ends of said T stem body element extended depth dimension and a heat sink body member saddle region semiconductor device reception area (the region that connects to the circuit board) located intermediate said first and second T arm portions on a depth dimension portion of said heat sink metallic body member; and

said T cross-sectioned heat sink body member including a T stem body element slot member-engaged keeper member (9) disposed along a second surface of the

circuit board to hold the circuit board in captured engagement between the T arm portions and the slot member-engaged keeper member.

Bosli does not teach that the circuit board is a printed circuit board, nor does Bosli teach that the heat sink is metallic. Terhaar et al. teach a printed circuit board (450), being used with a metallic heat sink (100). It would have been obvious to one of ordinary skill in the art to select a printed circuit board, since it is desirable to use the type of board that is known to function with the invention. It would have been further obvious to select a metallic heat sink since it is desirable to select heat sink materials that conduct heat well.

With respect to the recitation of the heat sink being shock hardened, this has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Moreover, since the structure taught by Bosli is identical to the claimed structure, it would have been inherently shock hardened.

Regarding claim 2, Bosli does not teach a heat sink wherein the metallic conductors and heat sink are copper. Terhaar et al. teach a heat sink comprising copper (Col. 2, lines 26 – 34). It would have been further obvious to use copper for the metallic conductors, since copper is a known material that is well suited for the intended

use. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Regarding claim 4, Bosli teaches a mounting apparatus, wherein the first and second T arm portions have a rectangular cross-section.

Regarding claim 5, Bosli teaches a mounting apparatus, including a semiconductor device received in intimate thermal contact with the heat sink saddle region (Col. 2, lines 14 – 19).

***Allowable Subject Matter***

7. Claims 13 – 20 will be allowed after the objected subject matter is resolved.

8. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not teach, alone or in combination, a mounting apparatus including "a grooved recess parallel with and adjacent said printed circuit board second surface along a second cross sectional extremity".

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Douglas W Owens
Examiner
Art Unit 2811